TO THE COMMISSIONER RESPONSIBLE FOR DIGITAL SERVICES, CONTENT AND NETWORKS

By J. Scott Marcus

* Digitalisation will be at the core of maintaining Europe's economic sovereignty, supporting the EU's climate strategy and ensuring economic growth, employment and competitiveness. Relevant and fast-moving developments include artificial intelligence (AI), the data economy and robotics – areas in which the EU has weaknesses.

Key measures you should take include pushing for public funding for AI and robotics, and promoting private funding for digital start-ups and scale-ups. You should also examine how digital technologies can help the EU reach its climate and environment goals, for example through new approaches to transport.

Because digital is everywhere, you will need to work closely with your colleagues, including the commissioners responsible for climate, energy, employment, transport and industry.

* ARTIFICIAL INTELLIGENCE
* DIGITAL INVESTMENT
* GREEN ICT

You take over a vitally important file for the future of Europe – digitalisation. Moreover, you step into this role at a critical point in time, implying a need to follow a different line to your predecessors. Whereas they might have viewed themselves as stewards of the digital sector, today digital is nearly everywhere, and a large part of your task will be: 1) to take whatever steps are necessary to facilitate the completion of the ubiquitous transformation of European business, government and society to a modern, digital basis; and 2) to ensure the continued competitiveness of Europe in an increasingly globalised and digitalised world.

That digitalisation has become widespread poses a challenge for you – the potential scope of your responsibilities greatly exceeds your authority. An integrated approach to digitalisation as a horizontal enabler for all sectors is called for, and this has implications not only for the policies you will pursue, but also for the manner in which you will interact with other European Union institutions, with your colleagues within the Commission, and with the member states. It also implies a need to maintain focus, since your area of responsibility touches nearly everything the Commission does.

The centrepiece of digital policy from 2014 to 2019 was the Digital Single Market (DSM) Strategy (European Commission, 2015a). This sought to boost the European single market primarily through the facilitation of cross-border electronic commerce within the EU. Dozens of legislative measures have been enacted (Marcus *et al*, 2019). This is all well and good, and has likely produced real benefits, but most of the gains that could potentially be achieved in this way have already been achieved. The next round of problems will not be solved using the same tools. It is time to declare victory and move on.

1 STATE OF AFFAIRS

The challenges Europe faces overall flow directly into the challenges you will confront as the commissioner responsible for digital services, content and networks.

Digitalisation is key to ensuring Europe's economic sovereignty (Leonard *et al*, 2019), supporting the climate strategy and ensuring economic growth, employment and competitiveness for the EU[1].

The world stands on the threshold of a transformative change thanks to digitalisation with possibly huge effects and resulting losers and winners. Consider for example:

- **Artificial intelligence (AI) and machine learning:** The collective potential value of these technologies in conjunction with the use of big data is enormous. For instance, McKinsey (2013) estimated that automation tools could take on knowledge work *"… equal to the output of 110 million to 140 million full-time equivalents …* [with] *as much as $5.2 trillion to $6.7 trillion in economic impact annually by 2025."*

- **The data economy:** IDC Italia and the Lisbon Council (2018) estimated the direct value of the data market in the EU28 at €50 billion in 2017, with the potential to grow to €77 billion in 2020 and €110 billion in 2025. Spill-overs into the broader EU28 economy based on the use of the data are much larger, representing €787 billion in 2025.

- **Robotics:** Take-up in Europe is substantial, especially in Germany. Globally, advanced robotics *"has the potential to affect $6.3 trillion in labour costs,"* according to McKinsey (2013).

Pressure from global trading partners and competitors

In just the past few years, the geopolitical system has been transformed. Many of the geopolitical challenges are directly relevant to you because many of them relate to digital technologies.

The EU is weak in key digital areas. Leadership in key technologies such as AI and machine learning has historically rested with the US, but is shifting rapidly to China. In 5G, another key technology, the US is not even a player while EU firms lag behind the frontier. Europe notably lags in AI, and much of Europe's expertise in AI is in the UK, which might soon be leaving the EU. None of the largest digital business-to-consumer platforms are based in Europe.

At the same time, Europe has strengths that should not be underestimated. Europe does better than the US on business-to-business online platforms, and tends to be much better than the US in a number of areas involving industrial automation and its intersection with AI.

Is Europe's weakness in some areas a problem? In the past, we might have argued that it was largely irrelevant whether enabling technologies were produced by European firms or by firms headquartered in our main trading partners. A corollary argument was that the gains to the EU from cross-sectoral use of these technologies were more important than potential gains from producing the technologies.

This argument is not convincing today. Technologies including AI and robotics are clearly dual use, which is to say that they have both civilian and military applications. Partly as a result, there are moves in the US to limit foreign investment in these areas, to limit visas for visiting foreign nationals (including citizens of NATO allies) and to impose export controls, with enabling legislation already enacted[2]. US measures have mainly targeted China, but the reliability and predictability of supply chains is inevitably called into question.

The most obvious ways in which to address the lack of predictability and stability of supply are: 1) by broadening the number of countries or regions from which Europe is supplied in order to spread the risk; and 2) by becoming increasingly self-sufficient in the production and deployment of key transformative technologies such as AI, machine learning, big data, robotics, the internet of things, transmission technologies such as 5G and key networks (Leonard *et al*, 2019; Farrell and Newman, 2019). The EU cannot hope to become self-sufficient in all of these areas, so it will be important to focus on technologies that are: 1) most critical; 2) most vulnerable to supply disruptions; or 3) for which it is most difficult to find alternate sources of supply.

This naturally raises the question of whether Europe is investing enough. This is a matter for public and private investment. This has implications not only for EU and member-state investments (which typically also hope to encourage private investment), but also for those aspects of the Capital Markets Union that seek to facilitate private investment in high technology. In terms of public investment:

- China has launched a comprehensive initiative to lead the world in AI development[3], and intends to invest massively in AI

research and development (He, 2017; Webster *et al*, 2017). The magnitude of the investment is difficult to estimate, but is large.

- The United States, its historical scepticism about industrial policy notwithstanding, is deeply concerned about the Chinese programme. The US already invested roughly €1 billion of public money in 2016 (European Commission, 2018; US National Science and Technology Council, 2016). Expanded countermeasures in response to the Chinese programme can be expected with the risk that Europe suffers 'collateral damage'.

- Europe has fallen behind in private investment in AI. In 2016, European private investment in AI amounted to €2.4-€3.2 billion in 2016, compared to €6.5-€9.7 billion in Asia and €12.1-€18.6 billion in North America (European Commission, 2018).

Thanks to its purchasing power, the EU can influence policy, and in some cases can lead. On data privacy, for example, even though many US firms initially opposed the general data protection regulation (GDPR, (EU) 2016/679), many of the largest US platforms now hope that most countries will adopt GDPR-like privacy arrangements. These firms have already internalised the cost of compliance, and would prefer to comply with one rigorous set of rules rather than with dozens of sets of rules of varying quality.

*CYBERSECURITY

Diverging approaches to cybersecurity are also evident, especially in relation to government surveillance for national security purposes. Since these reflect different views about the degree of free expression that should be allowed, divergent approaches are likely to persist in relation to cyberwarfare, fake news, election manipulation and more.

Worldwide agreement on these difficult themes seems unlikely in a world in which cooperation is breaking down; even so, some multinational initiatives show promise. Within the World Trade Organisation, the plurilateral initiative to establish new rules for e-commerce might gain sufficient traction. It might also conceivably be possible to reach agreement on rules for autonomous weapons.

> *The shift from fossil-fuel power plants to high shares of variable renewables such as wind depends on digital technologies*

Climate and environment

The EU remains committed to the goals of the Paris Agreement, but results have been mixed and greenhouse gas emissions have not yet fallen convincingly. The aspects most relevant to your portfolio relate to energy consumption, and especially to green ICT. The shift from fossil-fuel power plants to high shares of variable renewables such as wind depends on digital technologies that serve to adjust demand, dispatch power and adapt network operations to fluctuating feed-in of renewable energy in real time.

A special challenge for climate and environment measures is the risk of rebound effects. If a public policy measure improves the efficiency of energy utilisation, it is likely to lower the cost of the product or service in question, which will tend to increase the level of consumption. The increased consumption might wipe out part or all of the gains that the measure sought to achieve (Zachmann and Marcus, 2019).

2 CHALLENGES

Key challenges for the coming five years include: 1) the pace at which technological change is driving transformational change not only in firms and government, but in all societal arrangements, including the nature of work, and the need for digital training and re-training; 2) the breadth of policies that need to be addressed simultaneously; 3) limited EU competence in many of the areas where joined-up action appears to be needed; and 4) the increasing difficulty of achieving international cooperation, especially with the US and China.

Pressure from global trading partners and competitors

Ensuring that the EU achieves its potential as a digital player

* GREEN ICT

is largely within your remit. Responsibility for most of the key actions needed rests with other commissioners, but you will need to act as a 'digital champion', maintaining pressure to enact measures that promote innovation and the digitalisation of European business and society. Key portions of the Capital Markets Union, for instance, have been stalled for too long.

Digital has been prominent in disputes between the US, China and the EU. For these issues and for more to come, you will have a key role to play. On a range of issues including privacy, cybersecurity and fake news, you will need to show leadership. Relative to cybersecurity, the European Network and Information Security Agency is a key asset.

There is in particular a thought leadership role you could play in cases where the US or China try to push inappropriately Europe to take sides in their conflicts over digital technology. The Commission recommendation on 'Cybersecurity of 5G networks' (European Commission, 2019) is a case in point.

Climate and environment

Your primary challenge in this area is that, while digital plays a supporting role in most of the measures that are needed, in most cases the lead responsibility is elsewhere. Only in relation to green ICT will you have lead responsibility.

3 RECOMMENDATIONS

Your staff could employ instruments to directly implement policy within your explicit remit for digital services, including:

- **Regulation** of digital services, and also of relevant equipment;
- The **setting of standards**;
- The use of **trustmarks**;
- The creation of **public-private partnerships**;
- The creation of **expert panels** to provide guidance and to inform the public; and
- Any portions of the **Horizon Europe** research funding pro-gramme that are allocated to your area of responsibility.
  Some of these are 'soft' mechanisms, but they can nonetheless have useful effect. In discussing digital measures that could be

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used to benefit climate and environment, we provide an example of how these mechanisms could work in concert.

Other measures might require cooperation with other commissioners, or with the member states. For issues where digital technology is central, you need to demonstrate leadership and to line up the necessary institutional support.

General principles that you should follow include:

- **In formulating public policy, take a strategic view and adopt an EU Better Regulation perspective**: Define problems, identify possible solutions, provide comparative assessments of options and choose approaches that are most likely to be effective, efficient and coherent with one another and with other EU policies. More focus on top-down policy analysis and economic analysis is needed.

- **Do not be afraid to lead at international level:** In many of these areas, Europe can move the global debate forward. Tools for doing so are not limited to formal negotiations.

- **Enlist the public**: More can be done to facilitate the European public's understanding of digitalisation, and thus to enlist their support.

Pressure from global trading partners and competitors

Strengthening European entrepreneurship is important not only as a means of reducing the risk of disruption of the ICT supply chain, but also as a means of enhancing EU global competitiveness. You should promote of the following key measures:

- **Public funding for AI and robotics.** More public investment is likely to be needed in these potentially transformative

technologies (beyond that already foreseen in the 2021-27 Multiannual Financial Framework and the Digital Europe Programme), especially in AI and robotics, in order to maintain EU competitiveness. The Commission's proposal[4] to invest €9.2 billion through Digital Europe is in the right direction. Digital (and also climate) are major focus areas for Horizon Europe funding[5].

- **Private funding for start-ups and scale-ups.** The Capital Markets Union (CMU), which included some measures in this area, has made scant progress. EU start-ups and scale-ups continue to suffer from a lack of venture capital, challenges in conducting IPOs, and problematic and inconsistent insolvency regimes. You should push your fellow commissioners to take steps to facilitate equity funding, especially for innovative SMEs[6].

Protecting competitive advantage where Europe has it is likewise important, and has arguably received too little attention to date. You should work with your colleagues to take appropriate steps to better protect EU intellectual property, both for EU firms working in third countries and where third-country firms have invested in EU firms.

Promotion of the use of ICT is likewise important and might be more actionable than many of the measures to promote production. Use of ICT in the EU by large corporations is reasonably good, but ICT use by SMEs continues to lag. E-government could also benefit from more focus. You should be sure to make effective use of any allocations from InvestEU and from the European Innovation Council (an updated version of the Horizon 2020 SME Instrument).

Actual deployment of cross-border e-government services has languished, not primarily for technical reasons, but rather because the relevant services in the member states are so diverse.

Lack of trained ICT professionals is an impediment to both production and use. Training and education are important in dealing with the disruption to jobs that digitalisation is causing. Education and training are primarily a member-state responsibility, but you should be alert to opportunities for the EU to play a supporting role.

Issues related to privacy, cybersecurity, fake news and election manipulation will continue to percolate over the coming years. You will not have the lead in all of these areas, but are likely to be involved in all cases. Your role as head of a centre of expertise will be vital.

International negotiations addressing many of the same issues, as well as taxation of digital firms, will be challenging during your term, but they are not hopeless. You should look to build alliances with your counterparts in like-minded countries and find common ground where possible with countries that tend to have a different approach.

Climate and environment

No single 'silver bullet' will achieve the European goal of carbon neutrality by 2050, but there are a huge number of individual measures that could potentially help. Many of those measures are mutually complementary, but others are not, and in any event there are trade-offs to be made as to the amount of energy and resources to be applied to each instrument.

Broadly, a distinction can be made between measures that affect residential, commercial or industrial consumption of energy, and measures that affect production of energy.

On the consumption side, some measures seek to reduce consumption, while others seek to improve efficiency and to reduce waste. Some seek to reduce or improve the use of energy, while others seek to reduce or improve the use of materials (since materials also play a large role in global warming)[7]. Many of the most promising measures benefit from digitalisation.

On the production side, most measures entail shifting the production of energy from fossil fuels to various non-polluting and renewable sources. Digital technology is fundamental to the ability to flexibly shift from one power-generation source to another, and to take advantage of a mix of renewable sources and of energy storage (such as, for example, the batteries of electric cars).

On the consumption side, there are many sectors where digitalisation could generate substantial net gains. For example:

- **Digitalisation of agricultural production and distribution**

could offer surprisingly large benefits. The FAO (2013) estimated that roughly one-third of all food produced for human consumption in the world is lost or wasted, corresponding to 3.3 billion tonnes of CO_2 needlessly produced per year.

- Continued modernisation and digitalisation of the **transport sector** to favour public transport over the ownership and use of private vehicles saves both energy and materials. Sharing vehicles (a collaborative economy activity) could generate 13 percent to 18 percent less CO_2 emissions (Nijland and van Meerkerk, 2017). Avoiding transportation altogether through increased telecommuting and teleconferencing could play an important complementary role.

Green ICT is an aspect of consumption that is specifically within your remit. Improving data-centre efficiency, for instance, is an area where you could do more to work with market players, including US online platform providers.

Extending the product lifetime of ICT devices is another aspect of Green ICT. Exploring creative potential approaches to a particular problem can serve to demonstrate that you have tools that can be brought to bear.

Consider, for example, that mobile phones and tablets are typically able to operate in principle for four to five years, but most are replaced within two years (which historically was roughly the lifetime of the battery). Some users always want to have the latest technology, but there is good reason to believe that at least half of mobile devices are replaced either 1) because the manufacturer no longer is willing to support the software; or 2) because the battery has died, and cannot be replaced by the user. There are valid economic reasons why a manufacturer might prefer a design that does not permit the battery to be changed[8], but this economic calculation is made without pricing in the negative externality of the e-waste generated.

A general EU framework is already in place to promote energy efficiency (the Ecodesign Directive, 2009/125/EC), but it has mainly been brought to bear on devices such as clothes dryers with high energy consumption, rather than on low energy

consumption devices that require frequent replacement. It has not been applied to mobile phones or tablets – an area that is highly visible to EU consumers. There have been multiple calls to take stronger action on smart phones and tablets at EU level (European Parliament, 2018; ANEC and BEUC, 2018) in order to promote sustainability over the full product life cycle, taking into account composition, durability, disassembly, reparability and recyclability.

There are different ways in which policy might attempt, consistent with the existing EU ecodesign framework, to shift the balance to reduce needless waste. An outright prohibition on the sale or importation of devices with short product lifetimes has been tried elsewhere[9], but is an extreme solution that has negative impacts on competition and on consumer choice. A much less-intrusive approach, but with uncertain effectiveness, would be to create or adapt trust marks or ecolabels to favour mobile devices for which the manufacturer has committed support for at least, say, four years, and where either the battery is exchangeable or the battery can be shown to have an effective lifetime under normal use of at least four years. A more forceful approach would be to levy an excise tax on mobile devices that fail to meet these criteria, which ideally would be coupled with a subsidy (funded by the excise tax) for devices that comply. Reducing the cost of compliant devices with a subsidy would help to avoid burdening price-sensitive consumers.

Institutional issues

Digital is everywhere. This means that your remit is very broad, broader than your authority.

This implies a need to shift from a vertical, sector-specific focus to a horizontal focus where much of your work will entail cooperation with other commissioners. For climate and environment, this implies closer interaction not only with your colleagues responsible for those areas, but also with colleagues responsible for transport, energy and industry. For issues of social protection, you should work closely with your colleague responsible for employment. The portfolio you inherit has already been moving in that direction, but the shift from vertical to horizontal needs to accelerate[10].

NOTES

1   See the memo in this volume to the presidents of the EU institutions.
2   Measures taken by the Trump administration against China in general and against Huawei and ZTE in particular demonstrate that supply chains can be disrupted abruptly and arbitrarily, with little warning. See for example Jon Russel, 'Huawei can buy from US suppliers again — but things will never be the same,' *TechCrunch*, 1 July 2019, available at https://techcrunch.com/2019/06/29/huawei-us-supplier-ban-lifted/, and CBS News, 'Huawei ban could hurt chipmakers, raising fears of tech layoffs,' 21 May 2019, available at https://www.cbsnews.com/news/huawei-ban-sanctions-could-hurt-chipmakers-raising-fears-of-tech-layoffs/.
3   The 2017 *Next Generation Artificial Intelligence Development Plan*, available in English at https://chinacopyrightandmedia.wordpress.com/2017/07/20/a-next-generation-artificial-intelligence-development-plan/.
4   See http://europa.eu/rapid/press-release_IP-18-4043_en.htm.
5   See the memo in this volume to the commissioner responsible for research and innovation.
6   See the memo in this volume to the commissioner responsible for investment.
7   Circle Economy and Ecorys (2016) claim that more than "5*0% of our greenhouse gas emissions are related to material management*".
8   Raymond Wong, 'Smartphones with removable batteries are never coming back,' *Mashable*, 1 January 2018, available at https://mashable.com/2018/01/01/why-phones-cant-have-removable-batteries-anymore/.
9   Joel Hruska, 'New Bill Mandates Replaceable Batteries in Consumer Electronics,' *ExtremeTech*, 31 January, available at https://www.extremetech.com/mobile/263101-washington-state-mulls-bill-mandating-replaceable-batteries-easily-repaired-consumer-electronics.
10 A number of institutions and experts have suggested that it is time to re-integrate the approach to the digital and the non-digital aspects of the single market. Notably, a 2018 Presidency discussion paper on the future of the single market (Council of the European Union, 2018) observed that "*there is no need for a Digital Single Market but rather for a digitised Single Market.*" This emphasises the need for a more joined-up approach to digital policy.

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